

v. Doc Canada. Atomic Energy Control Board
Can " Committee on the operations of, 1949
com
A

1949

SECOND SESSION
HOUSE OF COMMONS

SPECIAL COMMITTEE

ON THE

OPERATIONS

OF THE

ATOMIC ENERGY
CONTROL BOARD

MINUTES OF PROCEEDINGS AND EVIDENCE

No. 3

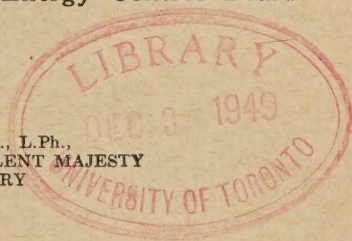
ed reports

TUESDAY, NOVEMBER 22, 1949

WITNESS

Dr. C. J. Mackenzie, President, Atomic Energy Control Board

OTTAWA
EDMOND CLOUTIER, C.M.G., B.A., L.Ph.,
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
CONTROLLER OF STATIONERY
1949



MINUTES OF PROCEEDINGS

TUESDAY, November 22, 1949.

The Special Committee appointed to examine into the operations of the Atomic Energy Control Board met at 11.30 a.m. The Chairman, Mr. McIlraith, presided.

Members present: Messrs. Breithaupt, Brooks, Coldwell, Gibson (*Comox-Alberni*), Green, Kirk (*Digby-Yarmouth*), Low, McCusker, McIlraith, Murphy, Pinard, Stuart (*Charlotte*), Winkler.

In attendance: Dr. C. J. Mackenzie, President, and Mr. G. M. Jarvis, Secretary, Atomic Energy Control Board.

The following documents were filed with the Clerk of the Committee:

1. General outline of organization and duties of the Atomic Energy Control Board, prepared for the information of Members of the Committee.
2. Chart showing the staff organization of the Chalk River project.
3. Health Radiation and Contamination Control, by G. H. Guest, Health Radiation Branch, dated January 1, 1948.
4. Proceedings of the Conference on Industrial uses of radioactive isotopes, held in Ottawa, December 7, 1948.
5. Industrial uses of radioisotopes, published by G. H. Guest, dated December, 1948.
6. The Melchett lecture of the Institute of Fuel, delivered October 8, 1947, by Sir James Chadwick (reprinted from "Nature", March 29, 1947).
7. Unclassified researches in Nuclear Physics at Chalk River—1948, by W. B. Lewis, dated 24 November, 1948.
8. Atomic Energy as the servant of humanity by David A. Keys. (Off-print from Queen's Quarterly, Vol. LV, No. 2, 1948).
9. Applications of recent advances in Nuclear Physics to medicine, by J. S. Mitchell (reprinted from The British Journal of Radiology).
10. Short Bibliography on Nuclear Physics, dated November 14, 1949.

On motion of Mr. Breithaupt,

Resolved,—That the Chairman write to Dr. D. A. Keys, Vice-President, National Research Council and Director of the Atomic Energy Project, thanking him for the many courtesies extended to the Committee on the occasion of its visit to the Chalk River plant and to the village of Deep River on Tuesday and Wednesday, November 15 and 16.

The Chairman read a letter from the Honourable Colin Gibson, Minister of Mines and Resources, inviting the Committee to visit the operations conducted by the Mines, Forests and Scientific Services Branch of his Department relative to research work for the Chalk River project.

On motion of Mr. Brooks,

Resolved,—That the Committee accept Hon. Mr. Gibson's invitation for a later date when it is found possible to take advantage of the opportunity to enter into this field of inquiry.

Dr. Mackenzie was recalled and further examined.

On motion of Mr. Gibson,

Ordered,—That 500 copies in English and 200 copies in French of this day's Minutes of Proceedings and Evidence be printed.

The Committee then went into private session and later adjourned to meet again in public session on Thursday, November 24, at 11.30 a.m.

R. ARSENAULT,
Clerk of the Committee.

MINUTES OF EVIDENCE

HOUSE OF COMMONS, NOVEMBER 22, 1949.

The Special Committee appointed to examine into the operations of the Atomic Energy Control Board met this day at 11:30 a.m. The Chairman, Mr. G. F. McIlraith, presided.

The CHAIRMAN: Perhaps the first step this morning is that we should indicate for the purposes of the record that we have tabled the documents given to us when we visited the Chalk River plant. I think it would be helpful if these documents were listed as being tabled today so that we will have a record of them. This would include also documents distributed to the members just before leaving for Chalk River.

Mr. GREEN: Do you mean they are being distributed to members of the house?

The CHAIRMAN: No, I mean tabled in the committee and a reference in our committee minutes to the fact that we have them available to members of the committee. There will of course be no other reference to them.

There is one other matter. I, as chairman, would like to express to Dr. Keys by letter our appreciation of the splendid organizational work he and his staff did.

Mr. BREITHAUP: I would be glad to move a motion of thanks to Dr. Keys. I think the whole trip and everything connected with it was arranged wonderfully and I do not think we could have been looked after better. I would like to move: that the chairman write to Dr. D. A. Keys, Vice President, National Research Council and Director of the Atomic Energy Project, thanking him for the many courtesies extended to the committee on the occasion of its visit to the Chalk River plant and to the village of Deep River on Tuesday and Wednesday, November 15 and 16.

Mr. COLDWELL: I second that motion.

The CHAIRMAN: I take it then that the motion is unanimously agreed to. Carried.

The CHAIRMAN: Before we resume the taking of evidence, I have a letter from the Hon. Colin Gibson, Minister of the Department of Mines and Resources, which reads as follows:

G. J. McIlraith, Esq., M.P.,

Chairman,

Committee on Operations of Atomic Energy Control Board,

Room 416,

House of Commons,

Ottawa, Ontario.

My dear McIlraith,—

I wish to congratulate you on your appointment as Chairman of the Committee recently set up to examine into the operations of the Atomic Energy Control Board. The investigation should be a most interesting one.

The Mines, Forests and Scientific Services Branch of this Department carries on certain activities which should be of interest to your committee. The Geological Survey of that Branch examines samples of ores sent in by prospectors and others to determine the uranium content. The Bureau

of Mines conducts research on the treatment of ores and undertakes metallurgical investigations for Chalk River. If your Committee cares to visit these operations, arrangements may be made by telephoning Dr. W. A. Bell, Acting Chief, Geological Survey of Canada, local 4610, and Mr. C. S. Parsons, Chief, Bureau of Mines, local 4422.

Yours sincerely,

COLIN GIBSON,

What is the wish of the committee with regard to the invitation in that letter.

Mr. GIBSON: Have we got time, do you think, to go into that stage of it? When are we going to be through? Can you tell us that?

The CHAIRMAN: That brings up the question of the whole situation with respect to prorogation of the house.

Mr. COLDWELL: I think if we could see some of these officials who are dealing with this matter it would be helpful to the committee, but perhaps we may not have time this session. I am hoping that this committee will be reconstituted next session and if so, we should try to enlarge the scope of the committee so that we can have a fuller knowledge of what the National Research Council is doing, not only in this but in other fields as well. We have never had an opportunity of finding out what the National Research Council is actually doing. They are doing a wonderful work. Before the war it was a small organization, and during the war it expanded greatly; but during that time we could not enquire about their activities. I think if we can get to see what the Research Council is doing we will have a good background of atomic energy. I can heartily agree to that.

Mr. GREEN: I think we have a very big job going into this question of atomic energy and, after all, while the evidence which could be given by the officers of Mr. Gibson's department is directly connected with the development of atomic energy I would suggest we finish our atomic energy enquiry before trying to start investigating the National Research Council. That is a very wide field; and if we get into that I think we would very soon lose sight of the atomic energy work which is our job.

Mr. COLDWELL: I am suggesting that for next session, Mr. Green.

Mr. BREITHAUP: That will be up to the house, of course.

The CHAIRMAN: I suppose we will have an opportunity of recommending that in the report if the Committee so decides. I am just dealing now with this particular invitation and asking your opinion as to what we should do about it.

Mr. GREEN: If Dr. Mackenzie completes his evidence and we get finished with any other evidence in connection with our business then perhaps we shall have time to hear Dr. Bell.

Mr. BREITHAUP: Mr. Chairman, as much as we appreciate the invitation extended by the Minister of Mines and Resources, I think the scope of the work we are handling is so large that I do not see how we can go off on a side road at the present time. I think that might be something for later consideration. That in itself is an interesting project, but I think the committee members are so absorbed in this very interesting work that Dr. Mackenzie is putting before us, that this second matter might be postponed for later consideration.

Mr. BROOKS: Could we not accept the invitation in the meantime and if time permits then we can go on to the subject under the guidance of Dr. Mackenzie here who could tell us whether it is necessary to accept this invitation to gain a proper knowledge of the subject on which we are reporting.

Dr. C. J. Mackenzie, President of the Atomic Energy Control Board recalled:

The WITNESS: Mr. Chairman, I think it is a matter of time. I am not responsible for the work of the Survey and the Bureau of Mines but I think they have activities there that would fall into three general categories: first the geological survey which, I understand, keeps in touch with the findings of prospectors and their normal routine work which we of the Atomic Energy Control Board have nothing to do at all. They also assay the samples which are sent in by the prospectors and others, which work, I think, is quite extensive, but it is analytical work. The next activity is a co-operative one between the metallurgical scientists and our own scientists on specific research problems of the character you saw in Chalk River.

The CHAIRMAN: It strikes me that it is a problem of time and that we are going to be confronted with the necessity of bringing our evidence to a close before we have dealt with many matters in which we are interested. I would think the situation is rather neatly summed up by Colonel Brooks when he asks whether we could not accept the invitation and take advantage of it when we are in a position to do so. If Mr. Brooks will move that we shall see if the committee agrees.

Mr. BROOKS: I so move.

Mr. McCUSKER: I will second that.

Carried.

The CHAIRMAN: This morning we have Dr. Mackenzie with us again this being our first meeting since our trip to Chalk River. If it meets with your wishes, Dr. Mackenzie is prepared to try to answer any questions arising out of the two day trip to Chalk River. Are there any questions or matters for discussion arising out of that?

Mr. BREITHAUP: Perhaps he could review the extent to which the experiments of the project have been made available to industry. In the first place, a good deal of our time was taken up in discussions and talks on its application but I believe some misunderstanding exists in the country as to the limitations of the information which might be available to industry by the Canadian project. Could Dr. Mackenzie enlarge on that subject, Mr. Chairman?

Mr. COLDWELL: Confusion in the house as well as in the country.

The WITNESS: I think the confusion is probably quite natural. The over-all picture is simply this. We are following exactly the procedures that are being followed in the United States and Great Britain. When I referred to the situation as being tragic I referred to the tragedy of the over-all scheme. I said the "tragedy in this game", meaning the over-all development of atomic energy was made very difficult due to the nature of the bomb and the fact that it was difficult to bring in industry in the normal way. That apparently got misunderstood. We are very familiar with the general situation and those in control in the three countries have repeatedly made remarks similar to those I made. Mr. Lilienthal has indicated in several addresses these inherent difficulties to American industry. He also pointed out the three main fields in which it was possible in the United States to have the ordinary practice of free enterprise operative. I will refer to his three fields and indicate that we are doing exactly the same thing as they are doing. The first field that he mentioned as being open to industry is in the field of mining, milling and processing. As I said before, that field in Canada is operating in exactly the same way. The second field is the preparation of radio-active tracer compounds and their use in private industrial operation and in process control. Our Canadian arrangements in this field are identical with those in the United States. We have laid the data before Canadian industry and

there is the same activity in that field. As far as our regulations are concerned the industries are as free in that field as they are in the United States. The third area is in the manufacture and maintenance of radiation detecting equipment and again we have followed exactly the same procedure as they have in the United States. In Canada today there are several firms who are actually building and selling equipment in this particular field. So that in those three areas we are following identically the same procedures as are being followed in the United States, Canadian industry is on the same basis as industries in the United States. Mr. Lilienthal in this paper refers to two other general fields. He refers to the fact that the Hanford plant and Oak Ridge plant are being operated by private companies. Now that is true but these are large production plants of which we have none in Canada. We started out to operate our Chalk River plant in exactly the same way. The first contracts were with D.I.L. who constructed this plant and who later had an operation contract, but they demanded to be relieved from the operating contract because our plant was not a production plant. Ours was essentially a research plant, and there was no benefit to industry and no advantage to anyone in that arrangement. Now exactly the same thing has happened in the United States.

The CHAIRMAN: That is in the arrangements to have D.I.L. operate the Chalk River plant.

The WITNESS: That is right. Their production plants in the United States are very large industrial facilities. The Hanford plant is operated by General Electric and the Oak Ridge plant by the American Chemical and Carbide Company; they have also five research establishments very similar to ours. Of the five only one establishment is operated by a commercial company and that is operated by a company for the simple reason that it is in the Oak Ridge territory. The others are operated by scientific organizations even more remote from industry than our establishment because they are university development establishments.

The next field in which the United States is co-operating with industry is in connection with the very large power development programs. They have, as you know, a laboratory at the General Electric site, called the Knolls site, and General Electric is there developing commercial power plants. That is a very large operation involving many many millions of dollars. There is a proposal now that the Westinghouse Company try to develop a power plant for naval vessels. Again that is a very large proposal. We, in Canada have not undertaken any development of that character. Ours is a research establishment as has been indicated, and we operate our research establishment precisely the same as the United States is doing and precisely the same as the United Kingdom is doing. There are two large stations in the United States where research is directed towards possible military application. Up until quite recently even those stations have been run by the University of California scientific department. Recently they have separated the establishment, and there is one laboratory, called the Sandia laboratory, operated by the Bell Telephone Company—a very large scientific laboratory.

Mr. BROOKS: Do General Electric and Westinghouse receive any assistance from the American government?

The WITNESS: It is entirely government money. There is no industry in the United States that has undertaken any expenditure of their own money on these projects. In the United States the Atomic Energy Commission itself is not an operating organization and they let contracts to some other body to operate the facilities. Our Atomic Energy Control Board operates in exactly the same way. The Atomic Energy Control Board has, I think, only eight members on its establishment. It makes a contract with Research Council to

operate Chalk River in the same way as the Atomic Energy Commission in the United States makes a contract with the University of Chicago to operate those very extensive Argonne laboratories and with the associated universities to operate Brookhaven which is another establishment about the size and scope of ours. The radiation laboratory, another laboratory of similar size, is operated under contract with the University of Southern California and Ames is operated under contract with Iowa State College. As you look at the overall picture one can state quite definitely that there is not any difference in the way industry is being handled in the two countries—or in the three countries. The overall difficulty, of course, is that the research for the bomb cannot be separated from the research for fuel. That problem goes to the heart of industrial application.

Mr. GREEN: Is there any governmental body in the United States operating a plant?

The WITNESS: I do not think so.

Mr. GREEN: Then the position is really quite different in Canada because here the Research Council, which is another branch of government, is doing the operating and that situation does not exist in the United States. In the United States all the operation is done by private companies and by the universities.

The WITNESS: That was a fundamental difference in the whole of their war work. Their war work was done that way. In Canada, operations are conducted under the Bureau of Mines and the Defence Research Board, the Research Council and so on, but the United States has adopted the principle of letting contracts, but to all intents and purposes those laboratories are government laboratories. Every nickel that goes into them is government money.

Mr. COLDWELL: The primary work is undertaken by the universities and not by the companies?

The WITNESS: In the laboratories comparable to ours the university merely accepts the contract and organizes a staff to operate those laboratories. The ordinary professor in the university normally does not have anything to do with it at all.

Mr. GIBSON: Are they on a cost plus basis or just cost?

The WITNESS: I will have to check that up, but I am quite sure that the universities do not put one penny into it.

Mr. MURPHY: The same applies to industry?

The WITNESS: Yes. I think the contracts would probably be identical.

By Mr. Green:

Q. Is the result not apt to be that if and when the secrecy restrictions are lifted industry in the United States will be in a much better position to go ahead and use what has been discovered?—A. Not by virtue of what they are doing in plants comparable to ours.

Q. They have plants of a type which we do not have in Canada at all?—A. They have very large production plants.

Q. Could Canada usefully operate such developments?—A. That of course is definitely one of the broad policies—how far should Canada go in this field?

Mr. Low: Just what are they producing in those plants?

The WITNESS: Fissile material.

Mr. Low: Both for fuels and for the bomb?

Mr. COLDWELL: Doctor, to what extent has Canadian industry shown an interest in the use of material now available to it? That would give some idea of the interest?

The WITNESS: There are three areas in which they can operate, and I would quote again from Mr. Lilienthal. The first area is mining, and there has been a lot of enterprise shown. If my memory serves me correctly there were about 5,000 samples sent in for analyses last year. The second area concerns the industrial use of isotopes and on that I think it is fair to say there has not been much done up to the present time.

Mr. COLDWELL: Industry has not shown very much interest in getting them?

The WITNESS: They have shown a great deal of interest. We had 150 people at the conference which I mentioned.

The CHAIRMAN: That is the conference of December, 1948?

The WITNESS: Yes. Industry is very interested and it is studying the possibilities of use, but the actual use to date has been very limited.

Mr. BREITHAUP: That is because of such factors as you told us about at Chalk River—

The WITNESS: We are talking about the industrial use of isotopes at the minute. Industry, I think, will use them, but at the present moment there is not as much use being made of isotopes industrially in Canada as in the United States.

By Mr. Green:

Q. The use of isotopes is quite apart from the industrial development to which you referred as being undertaken in the United States?—A. Large companies working for the government are working on research development projects.

Q. There are other industries using isotopes?—A. Yes. There is one large area of industrial activity where it is quite open to anyone to get isotopes and use them.

Q. Can anybody get those free?—A. Not only can they get them but Mr. Howe, at a luncheon on December 7, according to presumably accurate reports by the press, said that he would recommend that tracer atoms be provided free for a year for industrial use, and that a school be established at Chalk River to have industries get started in such use. So, Canadian industry has been given or offered a year's free supply of isotopes, and that is more than what has been done in the United States.

Mr. COLDWELL: To what extent has that offer been used within the year?

The WITNESS: To a very limited extent.

By Mr. Murphy:

Q. Is there any indication that say branch companies in Canada are accepting the facilities that are available on a comparable basis, shall I say, to their parent company on the other side of the line?—A. Do you mean General Electric and Westinghouse?

Q. Yes; and Dow Chemical?—A. General Electric is operating Hanford.

Q. The reason I ask, and you can perhaps couple your answer with what I have in mind, is that I am thinking of patents?—A. Let me deal with one thing at a time. General Electric in the United States is operating the Hanford plant. We have not any production plant in Canada and therefore the subsidiary in Canada cannot be given the benefits of a production which we have not got. The second point is that there is no development of a commercial power plant, that matter being secret—we know nothing about it. We are not engaged in that activity in Canada and so Canada cannot offer as much as is available to the parent companies in the United States.

By Mr. Gibson:

Q. We do not have anything like the per capita investment of the United States?—A. We operate a research establishment.

Q. Have you ever figured out the per capita expenditure?—A. It is very large in the United States.

Q. Our per capita investment would be low, but would theirs be five times as great?—A. The figures they mention are somewhere between two and three billion dollars as at the end of the war. I have not the precise figures but that is the order of magnitude and the corresponding figures in Canada ought to be about \$25 million.

Q. Their expenditure is about a hundred times greater while their population is only ten times greater than ours?

By Mr. Murphy:

Q. Is not their appropriation this year to be one billion dollars? I have a figure for 1950 of one billion dollars—A. The figure I have seen for this year runs around \$600 million—that is for 1949. I do not know exactly what the figure will be for 1950, but it must be very large. I would think if we are to make comparisons on some ratio we should apply the figure of one to fifteen. I understand that figure has been used when combining both ratios of population and national wealth. To equal the United States expenditures we would then have to be spending somewhere around \$40 million a year on atomic energy development whereas we are actually spending only \$5 million to \$6 million.

Q. Would you answer the question relative to patents? I would assume that your organization is protecting patents where necessary.—A. We control all the patents that our own organizations take out.

Q. They are not shared with any other country without your permission?—A. We own them. What we do with them is another step—the patent situation is, of course, a very difficult one in a secret field.

MR. GREEN: The Atomic Energy Control Board controls all patents whether the discovery is made by an employee of the government or a private individual. Is that not so?

THE WITNESS: That situation has never arisen and the situation perhaps could be explained by Mr. Jarvis, who is a lawyer.

MR. JARVIS: The situation is that patent applications in this field are referred to the Board and the Board has the right, if security is involved, to request the commissioner of patents not to proceed with the application and also apply the proper provisions about security of information.

MR. GREEN: The Board has the power also to take over all such inventions, has it not?

MR. JARVIS: It has the power either to prevent them from ripening into patents or to expropriate them.

MR. LOW: I had something in mind along those lines, more particularly the equipment in the electronic field.

THE WITNESS: I am sorry I did not understand your question.

MR. LOW: I had in mind the subject of equipment, more particularly in the electronic field. Now as I understood it a number of those items were developed in your own laboratories?

THE WITNESS: Correct.

MR. LOW: But certain companies have been requested to manufacture to the specifications of your scientists there. Now, what steps are taken to protect your patents or your secrets or whatever they may be, when those contracts are let to companies undertaking to manufacture these machines?

The WITNESS: We are following the general practice followed in the Research Council. Let me take one item, A, for illustration. We develop the prototype and in order to get it on the market it must be developed from the standpoint of industrial production; it must be engineered for production. Our procedure when we get a prototype, which appears to have some promise, is to negotiate with industries, and we usually ask them what deal they will offer, just like asking for bids and accepting the best proposal that will be made to us. Then we will make an arrangement with them to have the development carried out and we will arrange for some financial return, it may be on a royalty basis or some other basis. This is negotiated. However, we hand all our patents over to a Crown company, the patent corporation whose sole purpose in life is to get the best they can out of patents for the government.

Mr. Low: You feel you are fully protected against possible encroachments on your field?

The WITNESS: Let me put it this way. We operate there precisely the way any modern progressive industry would operate.

Mr. BREITHAUP: But you retain the right to the manufacture, I think that is what Mr. Low means. These machines have been designed by your scientists and are manufactured by certain companies that we know about through our visit to Chalk River, but the rights to manufacture are retained by the commission, are they not?

The WITNESS: We would enter into an industrial contract with a company to produce it and in the contract it would be specified what each party would do and what each would get out of it. Our general philosophy, of course, like any ordinary company, is to get the most we can out of the general development without cramping the real thing we are after.

Mr. Low: I think, Mr. Chairman, that there would be no harm in saying this, that there are some people—and I confess I am one of them—who feel a bit concerned about the possibility of some corporation moving in and getting control of some of these inventions, even including the results of your research in nuclear fission so as to make access to it very costly to the ordinary man.

The WITNESS: I would say, Mr. Low, that we have an organization which has been set up to prevent that as far as it can be prevented. We feel that the handling of patents is a subtle matter. You can stop the exploitation of an idea by a too rigid application of patents and the optimum that we are after is the greatest use for this equipment we are putting out at the best return to everybody concerned. All our agreements, of course, call for cancellation if there is any attempt to hold up production or costs. We have it in our hands to cancel the arrangements. I think that no organization is perfect but we recognize the problem, we recognize that it is not a simple problem; that it is wrong to be too categorical in any of these patent matters because the more experience you have the more you realize how involved the matter can be.

Mr. Low: I felt sure that was the case but I just wanted to have it on record.

Mr. BROOKS: There is a question I want to ask in reference to isotopes produced in Canada. Do we make these available to industries in the United States as well as in Canada?

The WITNESS: Might I just explain our position in respect to isotopes. The first thing we did was to adopt a system for distribution within Canada, and in that we followed very largely the general principles laid down by the other two countries which are involved. The second thing we have done is we have made arrangements for the distribution of isotopes outside our own borders, which we do not think will be a very large activity, but there are a number of isotopes which we can make at the moment that other countries cannot and we want the machinery to permit us to export them.

Mr. BROOKS: Are there reciprocal arrangements with the United States to receive theirs here?

The WITNESS: Yes.

Mr. PINARD: What would be the relation with the United States Radium Company, for instance? I will explain the purpose of my question.

The WITNESS: I do not know the company.

Mr. PINARD: The name of the company is United States Radium Co. They advertised isotopes for sale and I know of a plant in Quebec that tried to purchase these isotopes and were referred to Chalk River to get them and they did get them. I just wanted to know why the United States Radium Co. could not sell to this plant and why they referred the application to Chalk River?

The WITNESS: Are you talking about isotopes going out of Canada or isotopes that came from the United States?

Mr. PINARD: This plant saw an advertisement offering to sell isotopes. The advertisement was one sponsored by the United States Radium Company. These people in Quebec wrote to the United States Radium Company and were told in reply they could not sell to the Canadian industry and that they should make their application to Chalk River, which they did, and they got these particular isotopes from Chalk River.

The WITNESS: I do not know the details of this company but it is quite possible for a company to operate in Canada and buy isotopes from the United States and process them here, but the United States regulations would have to be complied with; but it is altogether probable that the United States would not do that without coming through Chalk River because their interest is in finding out what these are used for. They would probably refer them to us to see if we could supply them. But I have no precise information as to the company you are talking about.

Mr. PINARD: In this case it was the Rolland Paper Company in Quebec and they afterwards got in touch with the Board at Chalk River and purchased the isotopes they required for the sum of \$900.00. This plant wanted to use these isotopes as a device to help in the manufacture of paper. Now I wanted to know also how you establish the prices on these items.

The WITNESS: Well, we have a very elaborate system of establishing a price of—you mean the price of isotopes?

Mr. PINARD: Yes.

The WITNESS: We have a booklet which gives information on that. It has to be arbitrary because it depends on whether you consider the isotope a by-product or a main product and here again we follow very closely the system followed in the United States and in England. We arrive at prices which bear some relationship to the extra cost that is involved over and above what would be there if we did not make isotopes. So it is not any more precise than any other manufacturer could give in a similar case.

Mr. MURPHY: There is a principle involved in the question that is asked. I do not know whether it is too involved or not. But it had occurred to me when the question was being asked and answered that industry in this country in order to avail itself of any product as a result of research in this line cannot obtain it unless it obtains it through your organization. Here is an illustration where private industry endeavoured to obtain a material from a private industry in the United States, and this is, of course, a crown company, and the point I am making now is—I will not say it is restricted, but it is limited to obtaining any requirements that it may feel it needs from one source only, no matter where it is manufactured.

The WITNESS: That restriction would be put on by the United States not by Canada.

Mr. BREITHAUP: Is that the sort of agreement that is in effect?

The WITNESS: Canada could have no control at all over what United States information is available.

Mr. PINARD: Well, my people were informed by the United States Company that they could not be supplied with these isotopes from their plant, that they would have to make their application to the Atomic Energy Control Board here in Canada.

The WITNESS: That would be by reason of the United States regulations.

Mr. STUART: Could those materials be sold in Canada without the knowledge of your Board?

The WITNESS: No.

Mr. Low: I think Dr. Keys indicated to us while we were at Chalk River, roughly that industry had not yet taken as much advantage of their opportunities as they might have done; but I just wanted to ask this question: Has industry been allowed to send their research men to Chalk River for the purpose of being schooled in the uses of isotopes?

The WITNESS: Yes.

Mr. Low: Have they taken advantage of it?

The WITNESS: Some have. I have not the figures before me. Might I just say this? This was the point on which all the misunderstanding arose. We felt, and I think a number of members felt, that these generalizations were rather unfair to industry and that is why you decided to take the question Mr. Murphy asked me and my answer off the record. To a simple question: Is Canadian industry using isotopes to the same degree as American industry? I say no. But this is an unfair answer until you explain the whole situation and my point is that I do not want anything to come out that looks like an unfair remark to anybody. It was taken up the other day as something that Canada was doing in an unfair way to industry. But I think we should be very careful to get this thing clear because it is difficult to understand. Naturally Canadian industry is not in as good a position as American industry to take full advantage of these developments as they have not got nearly as many scientific laboratories. But they are getting better all the time and I would not like to see Canadian industry censured for this at all. I feel they are coming to realize the opportunities and are getting a lot of results perhaps through subsidiary companies. Now, with regard to this question you just asked about a pulp and paper company, there may be many cases like this which are not in operation yet but just about ready to become operative. The actual figures of use now do not tell that story.

Mr. Low: If they know the opportunities are there?

The WITNESS: We have referred several times to the conference on the industrial uses of radioactive isotopes which we organized in January 1949.

The CHAIRMAN: December 7, 1948.

The WITNESS: I am sorry. I was quoting the date of publication. I refer to the proceedings of the conference held on December 7, 1948. This meeting was organized for the specific purpose of laying before industry all the possibilities that we knew of and suggesting to them that it was a very promising field for their own ingenuity.

Mr. GREEN: That is the field of using isotopes.

The WITNESS: Yes.

Mr. GREEN: And isotopes are only a by-product?

The WITNESS: Yes, at the conference we had addresses by various gentlemen: Dr. Keys, Dr. Guest, Mr. Beam; and then we broke up into informal groups in the afternoon. There is a list in this document of the people that attended and as you can see it was a very representative group. I would say between one hundred and one hundred and fifty representatives from industry spent a day looking at this overall picture. They went home and unquestionably they are turning this over in their minds. But you have to wait a little time for the results. I think it will be very unfair to say that Canadian industry is not interested in this. I think you would find a lot of them are interested and in future you will find them beginning to put this interest into effect. But we have no definite evidence until they ask us about the purchase of isotopes.

Mr. GREEN: Is Canadian industry widening out into the field of development such as that being carried on in the United States by General Electric?

The WITNESS: No, it is all secret and cannot be passed over.

Mr. GREEN: Not at the moment.

The WITNESS: As soon as they can pass it on to American industry it will be declassified and then we can pass it on to Canadian industry.

Mr. GREEN: Would that not help Canadian industry if some such development were carried on in Canada?

The WITNESS: The real question you are asking is: Should we have these large production plants costing anywhere from fifty million to one hundred million dollars? I would say that if we had them they should be operated by a commercial company. But until you have that there is nothing to compare. We had originally an operating contract with D.I.L. Now, D.I.L. is one of the most competent industries in Canada to know whether or not there was any advantage in it to them and they said—"There is no advantage. We would like to be relieved from the operation of the Chalk River plant".

Mr. BREITHAUP: Regarding the point you raised earlier—that D.I.L. said it was of no benefit to industry—would you enlarge on that, because that statement might be misinterpreted?

The WITNESS: I do not know that I said D.I.L. actually used those words.

Mr. BREITHAUP: Yes, you used those words.

The WITNESS: I am afraid I use words too loosely. What I meant was this. D.I.L. had this contract, and they asked to be relieved of it because they thought the project should be operated the way it is operating now. My inference is that if there had been something of great value to them in such an arrangement—and their company was in on the ground floor—they would not have asked to be relieved.

Mr. COLDWELL: In other words they could see no immediate return for their investment or labour?

The WITNESS: No financial or any particular advantage to them as a company in being associated with what we were doing.

Mr. GREEN: Would you not say that the final position is likely to be that the United States will be doing all the productive development and that Canada will be doing all the research?

The WITNESS: That is a problem that the Parliament of Canada has to decide.

Mr. BREITHAUP: It would very foolish for the Government of Canada to spend a lot of money in development duplicating what is being done in the United States. All of these companies mentioned have branch plants in Canada so why should the duplication occur?

Mr. GREEN: Is there not some field in which Canada could do the development work? There is no reason why the United States should do all this development work.

The WITNESS: A very large percentage of the work which we are doing in Chalk River is what we would call development work, but we are not operating primarily as a production plant.

Mr. GREEN: A research plant.

The WITNESS: Hanford is operating just like any major chemical industry in the United States. It is a very large enterprise and it is operated along the lines of any first class industry. But they are not carrying on research and development work. That is being done in other establishments. Now the two large development laboratories are those having to do with commercial power and the power units for a naval vessel.

Mr. MURPHY: You spoke a few minutes ago about this power project being secret and Canada knowing nothing about it. That surely has nothing to do with the atomic bomb?

The CHAIRMAN: Will you repeat that question?

Mr. MURPHY: You spoke some time ago about these power projects being secret and that Canada knew nothing about them at all. Now that has nothing to do with the atomic bomb. It would appear to be an industrial development. Why should Canada be kept out of that field? It seems to me that that is something that Canada might take on in the field of atomic energy.

The WITNESS: Well, it is classified at the present time.

Mr. MURPHY: By the United States—

The WITNESS: That comes right back to the point which I have been trying to emphasize, that you cannot separate the military uses and the civilian uses in the way you can in ordinary developments.

By Mr. McCusker:

Q. A while ago you mentioned a fifty million dollar commercial plant. Would that be an atomic energy plant? You were about to welcome industry coming in and building a commercial plant at a probable cost of fifty million dollars. Would that commercial plant be something like General Electric on the other side or would it be an atomic energy plant?—A. I was talking about those large commercial contracts that certain companies have with the government.

Q. Not a structure but a contract?—A. Yes I used that figure as an indication of the size of them, not as the precise cost of a plant.

Q. Do you not feel that we, as a nation, cannot afford such an expense and that we are indeed fortunate in having a tie-in with the United States to give us all this information once it is declassified?—A. It is perfectly obvious we cannot spend as much money on research and development as is being spent in the United States.

Q. I do not know whether you saw it but you might be interested in a press report that a very small pile had been constructed by a British scientist—it can be operated in a basement and its expense is negligible.—A. Where did that come from?

Q. The report concerns an English scientist who has a sort of ashcan pile.

Mr. BROOKS: The British turned the thing down and he is peddling it now to the United States.

The WITNESS: The Times had an article on that a few days ago. We have a liaison office in London and when the matter was demonstrated our liaison officer was present and he reports that one should not take it seriously.

Mr. PINARD: You mentioned a price catalogue. Has that catalogue been made available to Canadian industry?

The WITNESS: Yes, it is a public document.

Mr. GREEN: What methods were used in the United States to increase the use of isotopes by industry? You said that the Americans were using them to a far greater degree than the Canadians. It may be that the United States had some better method of acquainting industry with the possibilities?

The WITNESS: I would not say that. I do not think they have done any more than we have done. This matter has been publicized; we have spoken about it; we have called conferences; and it has been published in unclassified documents ever since the end of the war, and anyone at all interested could hardly have escaped knowing about it.

Mr. PINARD: Do you advertise in any magazines?

The WITNESS: We do not advertise in that way.

By Mr. Stuart:

Q. Under the present setup, Dr. Mackenzie, is there any possibility that there may be a discovery whereby atomic energy can be used in industry?—A. We would certainly hope so.

Q. The same study that you mentioned was being carried on secretly in the United States would be taking place in Chalk River? You hope that some day you will reach that objective?—A. When you undertake a scientific problem that is always your aim. You undertake it because you think that something must come out of it.

Q. That would be one of the achievements to which you would look forward?—A. Yes.

The CHAIRMAN: It is a very necessary outlook in every type of scientific work.

By Mr. Breithaupt:

Q. Are there any by-products of Chalk River or any of the associated projects, available to industry, that can be used in their present form? As I understand it industry would have to do a great deal of research work to apply the use of isotopes—that would be true of any other by-product—before they can actually be used on a commercial scale?—A. They would have to decide what use they wanted to put them to and once the decision was made there would be a very great deal of information available. There are companies that will do that sort of thing for you.

Q. According to the information we received the other day, I do not know of any use to which any of those by-products could be put immediately—as they are delivered from the Chalk River project?—A. That may be true but it is not a big thing; the conditioning or placing of those tagged atoms into any compound is not a difficult thing and, if the demand was there, a lot of laboratories would do it immediately.

Q. It is a very difficult thing for any industry in Canada to use any of those products in their present forms?—A. That is true; and that is why, when I mentioned them, I did not use that particular expression. I said a good area for development is in the preparation of radio tracer compounds.

Q. For adoption by industry?—A. For use in industrial laboratories and processes.

Q. I think that clears the situation.

By Mr. Green:

Q. Dr. Mackenzie, you said this information concerning atomic energy for power purposes is secret at the moment. It is what you call classified but,

as I understood you, when it is declassified Canadian industry will have information available in just the same way as American industry?—A. That is true.

Q. Now is there any agreement with the United States to that effect?—A. That is what declassification means. The information then becomes public property.

Q. You simply meant that once it is declassified the whole world will know?—A. That is what declassification means.

Q. There is no arrangement with the United States whereby Canadian industry will be put on exactly the same footing as American industry which has been concerned with this development?—A. No, but once the development is declassified all industry is in the same position. General Electric is in a somewhat better position by virtue of its greater experience in operating the Hanford plant, but there are thousands of other companies in the United States which have no more connection with that than have Canadian industries. General Electric, of course, has a subsidiary in Canada.

The main point is that a development cannot be declassified in one country and not in another.

Q. General Electric in the United States will be miles ahead of companies in these other countries and they will not likely start producing in Canada, for instance, but they will probably proceed in the United States.

Mr. COLDWELL: Is there not something else that comes into this field—the policy of Canada in regard to the use of these things. It may be, as Canada has gone into publicly owned Hydro electric power, that we will decide that a similar plan should be followed in this field and that General Electric or any other corporation should not go into the field. It is not a simple matter of making this available to industry; there is the matter of public policy that enters into the picture.

Mr. McCUSKER: Should we, in committee, bring that up and express our opinions?

Mr. COLDWELL: I think we can express any opinions we hold, and I would certainly do so. It is not a matter of whether it is a right or wrong expression, but it seems to me that policy does enter into the matter of making this resource available to private industry.

Mr. GREEN: General Electric will have the information because they have a head start.

Mr. COLDWELL: Yes, they certainly will have a head start.

The CHAIRMAN: Is that not based on the assumption that what is being produced is usable in its present form? Is not that the flaw in the discussion? We have reached a point in this whole development where we do not yet know what will come out of it or whether it will be usable.

Mr. COLDWELL: I know, Mr. Chairman, but as I mentioned, public policy is a factor.

The WITNESS: The thing that stands out incontestably is that Canadian industry is in exactly the same position as American industry. Certainly, you can pick out one industry and say that for instance General Electric has a little advantage over the other industries in Canada and the United States, but, in the general picture, American industry and Canadian industry are in the same position.

Mr. GIBSON: D.I.L. said that they did not want to take advantage of their situation?

The WITNESS: I do not wish to quote them directly but they asked to be relieved.

Mr. GREEN: It was not the same sort of development. They did not want to continue to be in charge of a research plant.

Mr. GIBSON: They could not anticipate how far we would go in our development.

Mr. McCUSKER: I do not think that we can say anything that could be considered as a reproach to industry. We should not ask them to accept a burden that we cannot carry ourselves.

Mr. GIBSON: A company might have to put a thousand men at work on an endeavour without any possible immediate results.

By Mr. Green:

Q. How is this declassification handled? Is it a matter of a decision by the United States or is there co-operation between the three countries?—A. It is a co-operative decision.

Q. Is there any agreement?—A. I do not know how far I should be talking about these other things but certainly you are asking questions that are beyond the scope of the Atomic Energy Control Board. However, declassification is done internationally. It is not just a decision handed down by the United States. There is agreement between the three countries—by experts.

Q. Experts?—A. The committee that declassifies has as its members a group of real experts in the field.

Q. Is Canada represented on the committee?—A. Oh, yes.

Q. You spoke about industry being able to go ahead in the field of mining and milling. Can you amplify that at all? I ask because I understood from the evidence at one meeting that all production at the present time comes from the government company—Eldorado, and that they also do all the milling? Now where is there a field for private industry?—A. I said that the system is precisely the same as exists in the general mining field—that is as far as private enterprise is concerned. Whether or not anybody is active in the matter does not have any bearing on what the system is. The system is that any company can engage in the activity if it has the properties. Companies are trying to do that and, although I think it will take some years, it will be very surprising to me if out of all this activity there does not appear some company which will operate extensively.

Q. There is no company at the present time doing that?—A. There are a lot of companies which are in the preliminary stages.

Q. Could a company like Consolidated produce uranium or does it have to be produced by Eldorado?—A. No; any company is allowed to produce uranium. The only control exercised is over the sale of the product.

Q. Any company is permitted to produce finished uranium?—A. Yes.

The CHAIRMAN: Dr. Mackenzie has to attend another meeting at one o'clock and if it is agreeable to the committee, I suggest that we now settle the matter of what further evidence we shall hear.

(The committee went into closed session).

